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## **Medication Administration**

### **Information:**

EMS providers preparing to administer medications in the out of hospital setting should review and/or recite the "6 Rights" prior to administering any medication to a patient. While all 6 elements are important, In the out of hospital setting, special attention should be paid to the right medication, right dose, and right route - as these are frequently the areas of error in the EMS environment. In addition, EMS providers should ensure the patient is informed as to what medications they are receiving, and afford an opportunity for the patient to refuse. Lastly, documentation is essential so that medications administered in the out of hospital setting become part of the patient's clinical medical record. By following the "6 Rights" of medication administration, EMS providers will significantly decrease the potential and number of errors associated with medication administration.

### **Definitions:**

- I. Medication: Any pharmacological intervention used to treat, prevent, or reduce signs and symptoms of diseases, disorders, and/or traumatic injuries.
- II. Medication administration routes include the following: Intramuscular, Intravenous, Intraosseous, Oral, Buccal, Rectal, Inhaled, and Subcutaneous.

### **Procedure:**

- I. Prior to the administration of any medication ensure the following are reviewed and/or verbalized by at least two providers – if available (checked, and double checked):
  - A. 6 Rights of Medication Administration –
    1. Right Patient
    2. Right Dose
    3. Right Medication
    4. Right Route
    5. Right Time
    6. Right Documentation
  - B. Following administration of controlled medications, EMS personnel shall follow their individual department's policy on the correct accounting, disposal, and restocking of these medications.
- II. Calculating medications when given a dosage range and a per kg dose:
  - A. Calculate weight in kilos and multiply by the prescribed dosage (e.g. - mg/kg)
  - B. The resultant dose should be less than the maximum single dose.
    1. In adults, for ease of administration, doses may be rounded to the nearest whole number within the range for those calculated doses at or above 1 dosage unit, or to the nearest tenth for those below 1 dosage unit (examples: 1.2 mg rounded to 1 mg, and 0.26mg rounded to 0.3mg). That calculated and rounded dose may be given and repeated in timed intervals, as indicated for that medication, to the control of symptoms or maximum stated cumulative dose if symptom control is not previously achieved.
    2. For pediatric patients, utilize MI-MEDIC and a length based tape for all medication calculations.
  - C. Pediatric patients will never be given a single or total dose that exceeds the maximum single or total adult dose.

## **Medication Substitution**

### **Purpose:**

This protocol allows for MCA to substitute medications during a time of shortage without having to enact emergency protocols within the MCA. This protocol does not replace or override any portion of the **Medication Shortage Procedure**. All procedures within that procedure must still be followed in regards to substitutions in concentration or medication.

### **Indications:**

1. Medications indicated in the primary protocol are not available.
2. No other medication is listed in primary protocols as accepted by the MCA for use.

### **Procedure:**

1. Follow **Medication Shortage Procedure**.
2. Alternate concentrations are listed within this protocol for reference; these do not require a protocol change and are outlined in the **Medication Shortage Procedure**.
3. Notification and education of providers within the MCA should be done as soon as the substitution is known.
  - a. It is the responsibility of the MCA to distribute information on the shortages and substitutions to agencies for distribution to providers.
  - b. If a substitution is imminent, it is acceptable for an MCA to distribute information prior to the medication being substituted.
4. The MCA should notify the Division of EMS and Trauma if a substitution is suspected to last more than 60 days so that a more permanent protocol solution can be enacted.
5. All uses of substitute medications will be reviewed by PSRO for appropriateness.

<b>Current Medication</b>	<b>Alternate A</b>	<b>Alternate B</b>	<b>Protocols</b>
<b>Atropine</b>	Epinephrine 2-10 mcg/min infusion Pediatric 0.1 mcg/kg/min	Transcutaneous Pacing	<b>Bradycardia</b>
<b>Amiodarone</b>	Lidocaine 1-1.5 mg/kg IV Pediatric 1 mg/kg IV	Procainamide 20 mg/min, max 17 mg/kg IV/IO  Pediatric 15 mg/kg IV/IO over 60 minutes	<b>Adult and Pediatric Cardiac Arrest – General Adult and Pediatric Tachycardia</b>
<b>Calcium Chloride</b>	Calcium Gluconate 20 ml of 10% solution administered over 1 to 2 minutes IV (adults only)		<b>Poisoning/Overdose Cardiac Arrest – General (Adult)</b>
<b>Dextrose 50%, 50 ml</b>	Dextrose 10%, 250 ml IV  Pediatric Dextrose 10% 5 ml/kg IV	Glucagon 1 mg  Pediatric 0.05 mg/kg, up to 1 mg IM	<b>Adult and Pediatric Altered Mental Status Adult and Pediatric Seizures</b>
<b>Diphenhydramine</b>	Famotidine 20 mg IV Pediatric 0.25 mg IV Or Ranitidine 50 mg IV Pediatric 0.1 mg/kg IV	Hydroxyzine 50 mg IM  Pediatric 0.1 mg/kg IM	<b>Allergic Reaction</b>



**Michigan  
MEDICATION SECTION  
MEDICATION SUBSTITUTION**

Initial Date: 10/25/2017

Revised Date:

Section 9-2

<b>Lidocaine</b>	<p>Amiodarone:</p> <ol style="list-style-type: none"> <li>For Recurrent VF/VT: Adults 300 mg IV/IO repeat 150 mg one time. Pediatrics 5 mg/kg IV</li> <li>Wide complex Tach 150 mg x 2 PRN, pediatric 5 mg/kg IV</li> </ol>	<p>Procainamide 20 mg/min, max 17 mg/kg IV/IO</p> <p>Pediatric 15 mg/kg IV/IO over 60 minutes</p>	<p><b>Adult and Pediatric Cardiac Arrest – General</b></p> <p><b>Adult and Pediatric Tachycardia</b></p>
<b>Morphine</b>	Fentanyl 1 mcg/kg	<p>Hydromorphone 2 mg IV or IM</p> <p>Pediatric 0.05 mg/kg max dose 2 mg</p>	<b>Pain Management</b>
<b>Fentanyl</b>	<p>Morphine 4 mg IV/IO</p> <p>Pediatrics 0.1 mg/kg IV</p>	<p>Hydromorphone 2 mg IV or IM</p> <p>Pediatric 0.05 mg/kg max dose 2 mg</p>	<b>Pain Management</b>
<b>Midazolam (Versed)</b>	<p>Lorazepam 2 mg or 0.05 mg/kg IV</p>	<p>Diazepam 5 mg IV</p> <p>Pediatric 0.1 mg/kg</p>	<p><b>Adult and Pediatric Seizures</b></p> <p><b>Patient Sedation</b></p> <p><b>Excited Delirium</b></p>
<b>Ondansetron (Zofran)</b>	<p>Promethazine 12.5 mg IM</p> <p>Pediatric 0.25 mg/kg IM</p>	<p>Compazine 10 mg</p> <p>Pediatric 0.1mg/ kg</p>	<b>Nausea/Vomiting</b>
<b>Diazepam (Valium)</b>	<p>Midazolam 5 mg IV</p> <p>Pediatrics 0.1 mg/kg</p>	<p>Lorazepam 2mg IV</p> <p>Pediatrics 0.1 mg/kg IV</p>	<b>Adult Seizures</b>
<b>Ketamine</b>	<p>Midazolam 5 mg IV</p> <p>Pediatrics 0.1 mg/kg</p>	Fentanyl 1 mcg/kg	<p><b>Patient Sedation</b></p> <p><b>Excited Delirium</b></p>
<b>Midazolam</b>	<p>Patient Sedation: Ketamine 0.2 mg/kg IV/IO slowly</p> <p>Excited Delirium Adults only 4 mg/kg IM</p>	<p>Lorazepam 2mg IV</p> <p>Pediatrics 0.1 mg/kg IV</p>	<p><b>Patient Sedation</b></p> <p><b>Excited Delirium</b></p>
<b>Epinephrine 1mg/10ml</b>	<b>Epinephrine 1mg/1ml 30mL Vial</b>		
	<ol style="list-style-type: none"> <li>Expel 1mL of normal saline from a 10mL syringe (pre-filled)</li> <li>Instill 1mg(mL) of Epinephrine 1:1,000 from 30 mL vial in to pre-filled syringe</li> <li>30mL vials are to be single patient use only</li> </ol>		
	<b>Epinephrine 1mg/ml Ampule</b>		
	<ol style="list-style-type: none"> <li>Expel 1mL of normal saline from a 10mL syringe (pre-filled)</li> <li>Instill 1mg(mL) of Epinephrine 1:1,000 from ampule in to pre-filled syringe</li> </ol>		

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Protocol Source/References:

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## **Medication Shortage**

### **A. Definitions:**

1. **Alternate Concentration** – same medication, different concentration, while volume may change, the delivered dose remains unchanged, dilution may be required (*Epinephrine 1: 10,000 replaced using Epi 1: 1,000 with a 10mL diluent*)
2. **Alternate Supplied Volume** – same medication, same concentration, standard volume is unavailable, the delivered dose and volume remain the same (*Epi 1: 1,000, typically supplied in a 1mL vial replaced with Epi 1: 1,000 in a 10mL multi-dose vial due to shortage of the smaller vials*)
3. **Alternate Supply/Type** – same medication, standard supply type is unavailable (preloads vs. vials), dosing remains unchanged (*diphenhydramine 50mg/5mL preload is unavailable, replaced with diphenhydramine 50mg/5mL in a vial*)
4. **Alternate Form** – same medication, different route such that identical dosing does not yield the same systemic concentration or effect (*ondansetron 4mg vial unavailable, replaced with ondansetron 4mg ODT, option to repeat x 1 added to allow approximation of equivalent dosing*)
5. **Alternate Medications** – medication other than the standard approved medication which accomplishes an acceptably similar effect as the medication it replaces (*fentanyl 100mcg approved to replace morphine 10mg, dosing adjusted to obtain therapeutic equivalency*)
6. **Missing Medication** – standard medication which is unavailable (*amyl nitrite not available, acceptable alternative of Cyanokit is excessive in cost and size: alternate means to access treatment established – MEDDRUN*)

### **B. Criteria:**

1. Each EMS Medication Management System (MMS), be it at the individual MCA or at a wider regional level, shall establish and maintain a listing of the standard medications and supplies contained in drug bags or boxes supplied to life support agencies for the purposes of treating patients.
2. Each MMS shall maintain a dated listing of alternative medications which are approved as substitutes or replacements for medications which are in shortage.
3. Due to the frequency of medication shortages and the need for alternative dosing or medication substitutions, each MCA shall develop and enact a medication cross-check procedure, to which EMS personnel will be held accountable as a means to avoid medication errors
4. Both the standard list and the alternate list (may be combined into a single document) shall be made readily available to system participants
5. The MMS shall enact policies/procedures which guide each of the following:
  - A. Recognition of medication shortages and a means to report them
  - B. Pharmacy involvement in the investigation and designation of acceptable alternatives when shortages are identified
  - C. An organized process by which participant pharmacies will enact the replacement or substitution

- D. A documented means of visually identifying when an alternative medication or dosing has been placed into an EMS drug bag or box, or when a medication is missing
- a. **Alternate medications** will be indicated by the placement of a sticker, tag or label on the outside of the bag or box; on the compartment where the alternate medication is located (if applicable) such that one inspecting the bag or box could easily recognize that the medication was included and what the missing medication it is intended to replace was. (Stickers GREEN or WHITE with GREEN)
  - b. **Missing medications** will be signified by the placement of a sticker, tag or label on the outside of the bag or box, on the compartment where the missing medication would be located (if applicable) such that one inspecting the bag or box could easily recognize that the medication was missing and what the potential alternate medication was. (Stickers YELLOW or WHITE with YELLOW)
- E. A method for dissemination of information related to changes made to the MMS drug bags or boxes with a means of accounting for receipt of the notifications at the agency/pharmacy levels

**C. Selection of Alternative Medications:**

1. Alternative concentrations, alternative supply/type and alternative supplied volume may be approved at the MCA/MMS level without a change to protocol provided that the standard and approved alternate medications are documented in the required lists, by effective date or date range.
2. Alternate form and alternate medications may be enacted as an emergency protocol according to statute and state approval, in the event of imminent shortage.
3. Non-standard medications, or those with no precedence of EMS use within Michigan must be submitted as new protocol submissions. The state may allow for expedited review in the event of imminent shortage of the medication being replaced.
4. If a missing medication will not be replaced, or an acceptable alternative is not found, a protocol or process should be developed or presented which addresses the potential inability to meet the existing protocol established standard of care.

**D. Process:**

1. A brightly colored ALTERNATE DOSE sticker/tag MUST be attached to the outside of the drug bag, box or narcotics box that lists the effected medication, the concentration of the substituted medication, the expiration date of the medication and the pharmacy name/date.
2. A brightly colored – MISSING MEDICATION sticker/tag must be placed on bags/boxes when a protocol medication is not available to stock in that bag/box.
3. A dosing/instruction card may be required to be included in the bag/box depending on the change.

4. Pharmacies experiencing shortages must provide notification of the need to utilize alternate dosing to the MCA and the drug exchange coordinator, and receive approval, prior to any change being implemented.
5. Drug bags, boxes or narcotics boxes with alternate dose medications/missing medications should have the medication replaced and the sticker/tag removed by pharmacy as soon as possible when the proper medication or concentration of medication is available.
6. Any additional equipment, which is needed to deliver the medication, must be included with the alternate dose. *(I.e. – Medication is typically in a carpupject but a vial is being substituted due to shortages of the carpupject version. An appropriately sized safety needle and syringe must be available within close proximity to the medication in order to facilitate administration. These supplies too may be removed when the proper medication concentration is returned to the bag/box.)*
7. EMS Agencies receiving notice of the utilization of alternate dosing, alternate medications or missing medications due to shortage must post the changes and ensure that all providers that may have cause to use the medications are made aware of the changes and are educated on proper use, risk and dosing of any new or replacement medication prior to their first potential exposure to the alternate dose or medication.
8. Any Special Instruction for a particular shortage will be communicated to all effected pharmacies and EMS services.

***Intranasal Medication Administration (Optional)***

- Medical Control Authorities choosing to adopt this supplement may do so by selecting this check box. Adopting this supplement changes or clarifies the referenced protocol or procedure in some way. This supplement supersedes, clarifies, or has authority over the referenced protocol.

**Purpose:** This optional procedure authorizes intranasal medication administration by paramedics (and other levels of licensure, for naloxone) using an FDA-approved atomizing device. This procedure authorizes the substitution of the intranasal route for other routes specified in individual protocols as approved for specific indications stated below by the local medical control authority.

**Indications:** In general, the intravenous route is preferred for medication administration. This procedure may be considered when IV access is unavailable and when a needleless delivery system is desired because of patient agitation, combativeness, or similar conditions that may pose a safety risk to personnel.

**CHECK MCA APPROVED INDICATION**

- Pain Management
- Altered Mental Status with Suspected Opiate Overdose
- Sedation
- Seizures

1. Select desired medication and determine dose (See Medication Table).
2. Draw up appropriate dose (volume) of medication plus an additional 0.1 mL to account for device dead space.
3. Attach atomizing device to syringe.
4. Use one hand to support back of patient's head as needed.
5. Place tip of atomizing device snugly against nostril aiming slightly upward and outward.
6. Rapidly administer one half of the dose of medication, briskly pushing plunger.
7. Repeat with other nostril delivering the remaining volume of medication.
8. Use the highest concentration available for the medication.
9. Note: Maximal dose per nostril is 1 cc.

Indication	Medication
Suspected Opiate Overdose	Naloxone (1mg/1mL)
Sedation/Seizures	Midazolam
Adult Pain Control	Fentanyl
Adult Pain Control/Sedation	Ketamine
Pediatric Pain Control	Fentanyl
Pediatric Sedation/Seizure	Midazolam
Pediatric Pain Control/Sedation	Ketamine

10. Dosing is outlined in each protocol.

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Protocol Source/References:

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## ***Field Drug Box and IV Kits***

- I. Emergency medical service vehicles will be equipped with drug boxes and IV kits consistent with their licensure level and protocols.
- II. IV kits and drug boxes will be prepared by participating hospital pharmacies prior to each patient use. The pharmacy will seal and secure the drug box and IV kits.
- III. Drug boxes and IV kits will be labeled with a pharmacy label which contains, at a minimum:
  - A. The name of the re-stocking pharmacy
  - B. The name or initials of the certifying pharmacist
  - C. The expiration date of the box or kit (and ID of first expiring med)
  - D. The date the box or kit was refilled
  - E. The tag number of the locks assigned to the box.
- IV. Licensed EMS personnel will assure that a proper seal is in place on any drug box or IV kit when it is provided by the participating pharmacy. The ambulance agency and licensed EMS personnel are responsible for the security of the medications and supplies.
- V. Drug boxes and IV kits shall be locked and secured in the EMS vehicle, except when required for patient care. Each agency will have a procedure in place to ensure controlled access to the drug box.
- VI. Licensed EMS personnel will document the medications used from the drug box and/or IV kit. A physician, PA or NP signature is required as part of the documentation when controlled substances are administered. The documentation will accompany the sealed drug box when returned to a secure location for pharmacy exchange.
- VII. Whenever controlled substances are used from a drug box, any unused or contaminated drug must be disposed of in the presence of a licensed hospital employee or physician authorized to dispense that medication. This witness shall also sign their name on a patient care record, attesting to the disposal of the unused drug.
- VIII. Opened syringes, needles, and any broken glass ampules will be properly disposed of and not left in the drug box. It is the responsibility of the licensed EMS personnel to clean any blood or body fluids from the inside of the drug box before it is returned to the pharmacy.
- IX. The pharmacy shall routinely inspect these medications and will verify the contents and replace the medications as necessary.
- X. If a pharmacy or agency discovers a discrepancy in drug box contents, they shall contact the last pharmacy or agency which had possession of the box and mutually resolve the discrepancy. The pharmacy/agency, which discovered the discrepancy, shall submit a report to the medical control authority documenting the circumstances and the resolution. If the pharmacy and agency are not able to arrive at a mutually agreeable solution, the issue shall immediately be forwarded to the medical control authority for investigation and resolution.
- XI. The contents of the drug box are subject to inspection at any time by participating hospital pharmacy staff or by the medical control authority.



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## ***Pharmacy, Drug Box and IV Supply Exchange Procedure***

1. Pharmacies operated within the member hospitals of the medical control authority participate in the medication exchange system established by this protocol.
2. The pharmacy is responsible for ensuring that re-stocked EMS drug boxes and IV supplies are available to EMS units who bring in a used box for replacement. The Administrative Rules of the Michigan Board of Pharmacy (R 338.486(4)(c) require that “The pharmacist shall routinely inspect these medications and, after use, shall verify the contents and replace the medications as necessary”.
3. The pharmacy is responsible for providing a secure environment for restocked drug boxes and IV supplies awaiting pickup by an EMS unit and used boxes brought back for restocking.
4. Upon receiving a used box from an EMS service, the pharmacy will check to assure that the box is properly sealed and contains documentation of medication use, signed by a physician for drug exchange, is in the box. The documentation will be checked, by the pharmacist, against the remaining contents of the box to assure accountability for all medications. The pharmacy will design a system whereby EMS units present appropriate documentation when replacing used IV supplies.
5. The pharmacy will replace the used contents of the drug box and IV supplies, and verify that all supplies and medications listed on the medical control authority drug box inventory form are present. The box will be sealed and secured.
6. The refilled drug box will then be relabeled with a pharmacy label which contains, at a minimum:
  - A. The hospital name
  - B. The name or initials of the pharmacist checking the box
  - C. The date the box was restocked and checked.
  - D. The expiration date of the first drug to expire in the box (this date must be at least three months from the date the box is being restocked and checked).
  - E. The tag number of the locks assigned to the box.
7. Drug box contents remain the property of the participating pharmacy. The box itself is owned by the entity (EMS or hospital) that purchased it and entered it into the system. The medical control authority will maintain a listing of the drug box numbers currently “in service”, and will assign new drug box numbers, as needed.
8. The Director of Pharmacy at each participating hospital is responsible for assuring compliance with this policy.



**Michigan**  
**MEDICATION SECTION**  
**NALOXONE MEDICATION KIT CONTENTS**  
**AND DISTRIBUTION PROCEDURE (OPTIONAL)**

Initial Date: 6/26/20

Revised Date:

Section 9-6a

***Naloxone Medication Kit Contents and Distribution Procedure***

- I. Medications and supplies for naloxone kits will be supplied by member facilities within the MCA.
- II. Assembly, labeling, and access to kits will be done according to the **Pharmacy, Drug Box and IV Supply Exchange Procedure.**
- III. Overdose Medication Kit Contents List

<b>Medication / Item</b>	<b>Concentration</b>	<b>Packaging</b>	<b>Quantity</b>
Naloxone (Narcan)	4mg / spray	Nasal Spray	1
MDHHS Safety Advice for Patient and Family Members Card			1
Resuscitation Face shield*			1* *(MCA Optional)
Replacement Form			1
Local Treatment Resources Form			1

- IV. Procedure
  - A. Each participating EMS Agency will stock each of its licensed vehicles with 2 Naloxone Medication Kits. After deployment, the naloxone medication kit will be replaced within 24 hours at the assigned stocking hospital pharmacy.
  - B. Kits will be stored on the EMS vehicle in a secure way, not accessible to the public.
  - C. Deployment of a Naloxone Medication Kit will be documented the patient care record and uploaded to the Michigan EMS Information System.
  - D. The replacement/use form will be completed and returned to the designated hospital pharmacy for dispensing of a replacement Naloxone Kit.

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## ***Epinephrine Auto-Injector Procedure***

**Aliases:** Epi-Pen ®

**Purpose:** To allow use of epinephrine auto-injector/pediatric epinephrine auto-injector for life-threatening anaphylaxis by authorized prehospital providers licensed at or above the Emergency Medical Technician level. \*If MCA selected, epinephrine auto-injectors are approved for Medical First Responder use.

**MCA Approval of Epinephrine Auto-injector for Select MFR Agencies**  
**(Provide List to BETP)**

YES  NO

### **1. Indications**

- A. Life-threatening allergic/anaphylactic reactions
- B. Use with Allergic Reaction/Anaphylaxis Protocol

### **2. Contraindications**

- A. No absolute contraindications to life-threatening anaphylaxis
- B. Caution: Use with caution in patients with heart disease, high blood pressure, and stroke.
- C. Patient weight less than 10 kg.

### **3. Technique**

- A. Epinephrine auto-injector is an auto-injector that injects medication into the intramuscular tissue when the device is pushed against the skin. Injection is to be done at the anterolateral portion of the thigh.
- B. Dosing: Epinephrine auto-injector (0.3 mg) is used for patients weighing over 32 kg. Pediatric epinephrine auto-injector (0.15 mg) is used for patients weighing at least 10 kg.
- C. Instructions for use are pictured on the side of each auto-injector.
- D. The auto-injector must be held in place for ten (10) seconds once the needle injects into the thigh.

### **4. Documentation**

- A. EMS providers will note any changes in the patient's condition and report those changes to on-line medical control and document changes on the run form and complete the Epinephrine Auto-injector Utilization Form.

### **5. Accountability**

- A. Epinephrine auto-injectors will be stored in a securely locked compartment in a temperature controlled area of the EMS vehicle.
- B. Epinephrine auto-injectors must be restocked at the pharmacy or through other Medical Control approved process in conformity with current pharmacy laws and the public health code. Utilization forms must be completed for each use.



**Michigan**  
**MEDICATION SECTION**  
**EPINEPHRINE AUTO-INJECTOR PROCEDURE**

Initial Date: 05/31/2012  
Revised Date: 10/25/2017

Section 9-7

Epinephrine auto-injector Utilization Form  
(To be used by Hospital)

<u>Drug</u>	<u>Standard</u>	<u>Quantity</u>	<u>Count</u>	<u>Exp. Date</u>
Epinephrine auto-injector	0.3 mg	1	_____	_____
Pediatric Epinephrine auto-injector	0.15 mg	1	_____	_____

Run Date \_\_\_\_\_

Patient Name \_\_\_\_\_

Physician \_\_\_\_\_

EMT \_\_\_\_\_

Receiving Hospital \_\_\_\_\_

## Nebulized Bronchodilators

### Indication

1. Patient with respiratory distress and wheezing.
2. When indicated under specific treatment protocol.

#### MCA Selection for Nebulizer

- EMT-B
- Specialist
- Paramedic


### Procedure



1. Obtain vital signs and lung sounds.
2. Place the appropriate volume of medication in the lower half of the nebulizer unit. Then screw the upper half of the unit in place.
3. Attach the nebulizer to the base of the T piece. Then attach the mouthpiece to the T piece or connect neb chamber to NRB mask.
4. Attach one end of the oxygen tubing to the base of the nebulizer and the other end of the oxygen tubing to the oxygen source.
5. Set the oxygen liter flow at 6 L/min.
6. Instruct the patient to breathe normally through the mouthpiece, taking a deep inspiration every 4 or 5 breaths.
7. Continue the treatment until all the medication has been delivered through the nebulizer. You may need to gently tap the reservoir once or twice during the treatment to re-disperse the medication.
8. Obtain and record another complete set of vital signs and lung sounds after completion of the treatment.

### Medication Dosage



1. Administer Albuterol 2.5 mg/3 ml NS nebulized, if available, repeat as indicated.
2. Administer treatment number one as Albuterol 2.5 mg/3 ml NS and Ipratropium 0.5mg/3 ml NS nebulized if wheezing or airway constriction.
3. Per MCA selection administer additional bronchodilator treatments as Albuterol 2.5 mg/3 ml NS nebulized OR Albuterol 2.5 mg/3 ml NS and Ipratropium 0.5 mg/2.5 ml NS nebulized, as needed, if wheezing or airway constriction persists. For patients **age 5 or under**, Ipratropium .25 mg should be given in conjunction with albuterol. 

#### ADDITIONAL BRONCHODILATOR TREATMENTS

- Albuterol 2.5 mg/3 ml NS  
OR
- Albuterol 2.5 mg/3 ml NS and Ipratropium 0.5 mg/2.5 ml NS

### Pediatric Considerations



1. Infants and small children may not be able to use adult mouth piece and may need to use blow-by or pediatric mask.

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## ***Naloxone Administration***

**Aliases:** Opioid overdose medication

**Indications:** Decreased level of consciousness associated with respiratory depression from **Opioid Overdose**, without other apparent cause (e.g., stroke, hypoglycemia).

**MCA Selection for Naloxone Administration**

MFR       EMT

### **Procedure:**

Consider administration of Naloxone when:

1. Ventilations have been established and patient has not regained consciousness.
2. There is more than 1 rescuer on scene for personnel safety precautions.
3. Treatment goal is to restore effective respirations; the patient need not be completely awakened.
4. Per MCA Selection (below), administer Naloxone intramuscular auto injection OR Intranasal via prefilled syringe with atomizer (half the dose in each nostril), OR Narcan® Nasal Spray. May repeat one time in 3-5 minutes if effective respirations not restored.

**MFR/EMT Administration Options (MUST SELECT AT LEAST ONE):**

- Naloxone Intramuscular Auto Injector 0.4mg IM (Adults Only)
- Narcan® Nasal Spray 4 mg (Adults Only)
- Naloxone Prefilled-2 mg/2 ml IN via Atomizer
  - Adult and child over 3 years: 2ml
  - Pediatric Dosing:
    - Up to 3 months: 0.5 ml
    - 3 months up to 18 months: 1 ml
    - Children 19-35 months: 1.5 ml

- S** 5. Administer Naloxone IM, IN or slowly IV, titrating to restore effective respirations.
- Adult: 2 mg IM, IN or IV
  - Pediatric: 0.1mg/kg IM/IN/IV-Refer to the MI-MEDIC Cards for proper dosing.

**SPECIALIST/PARAMEDIC Administration Options (Must select at least one):**

- Naloxone 2.0 mg/2ml IM, or IV
  - Adult and child over 3 years: 2ml.
  - Pediatric Dosing:
    - Up to 3 months: 0.5 ml
    - 3 months up to 18 months: 1 ml
    - Children 19-35 months: 1.5 ml
- Naloxone Prefilled-2 mg/2 ml IN via Atomizer –
  - Adult and child over 3 years: 2 ml
    - Distribute half of the dose in each nostril.
    - Up to 3 months: 0.5 ml
    - 3 months up to 18 months: 1 ml
    - Children 19-35 months: 1.5 ml

- Repeat every 3-5 minutes as needed to restore effective respirations. Note IN Naloxone should only be repeated one time.
- Treatment goal is restoration of effective respirations; the patient need not be completely awakened.
- Transport supporting ventilations as needed
- Notify medical control.

## 2-Pam Chloride/DuoDote

### Protocols:

1. Nerve Agent Organophosphate exposure







### Indications:

1. Exposure to organophosphate or nerve agents
2. Given in conjunction with atropine in DuoDote or Mark-1 kit

### Contraindications:

1. None

### Dosing:

1. Self-Rescue – 1 DuoDote (Mark-1) Injector
2. Mild Reaction
  - a. Adults (8 years and over) – 1 DuoDote (Mark-1) Injector
  -   b. Pediatrics – Contact Medical Control
3. Moderate Reaction
  - a. Adults (8 years and over) – 2 DuoDote (Mark-1) Injectors
  -   b. Pediatrics – Contact Medical Control
4. Severe Reaction
  - a. Adults (8 years and over) – 3 DuoDote (Mark-1) Injector
  -   b. Pediatrics – 1 DuoDote (Mark-1) Injector, Contact Medical Control as needed

### Expected Effects:

1. Decrease in symptoms

### Side Effects:

1. Blurred vision
2. Headache
3. Dizziness
4. Nausea



## **Acetaminophen**

### **Protocols:**

1. Pediatric Fever
2. Pain Management (per MCA selection)


### **Indications:**

1. Fever
2. Mild pain

### **Contraindications:**

1. Hypersensitivity
2. Known severe acute liver disease

### **Dosing:**

1. Adults – 15 mg/kg PO, maximum dose 1 gm
-  2. Pediatrics – 15 mg/kg PO, maximum dose 500 mg

### **Expected effects:**

1. Decrease temperature
2. Pain Relief

### **Side effects:**

1. Nausea/vomiting

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## **Adenosine (Adenocard)**

### **Protocols:**

1. Tachycardia (Adult and Pediatric)


### **Indications:**

1. Specifically for treatment of Supraventricular Tachycardia.
2. Consider for regular or wide complex tachycardia.

### **Contraindications:**

1. Sick sinus syndrome
2. Hypersensitivity to adenosine
3. 2<sup>nd</sup> or 3<sup>rd</sup> degree heart block

### **Dosing:**

1. Adult
  - a. 6 mg rapid IV/IO push over 1-3 seconds
  - b. Repeat at 12 mg after 1-2 minutes, if no conversion
  - c. Medication should be followed by a rapid 30 ml NS bolus
-  2. Pediatric
  - a. 0.1 mg/kg IV/IO rapid bolus. (Max dose 6 mg)
  - b. Repeat at 0.2 mg/kg after 2 minutes (Max dose 12 mg)
  - c. Medication should be followed by rapid 5-10 ml NS flush

### **Expected Effects:**

1. Slowed conduction through the AV node
2. Conversion to NSR

### **Side Effects:**

1. Hypotension
2. Flushing
3. Dyspnea
4. Light-headedness
5. Nausea

## ***Albuterol (Ventolin®)***

### **Protocols:**

1. Nebulized Bronchodilators
2. Crush Injury
3. Adult and Pediatric Respiratory Distress
4. Adult and Pediatric Allergic Reaction/Anaphylaxis

### **Indications:**

1. Bronchospasm (wheezing)
2. Crush injury syndrome with evidence of hyperkalemia

### **Contraindications:**

1. Hypersensitivity to albuterol

### **Dosing:**



1. Adults and pediatric
  - a. 2.5 mg in 3 ml NS via nebulizer

### **Expected Effects:**

1. Dilated bronchi
2. Improvement in capnographic waveform (if available)

## ***Amiodarone (Cordarone)***

### **Protocols:**

1. General Cardiac Arrest – Adult and Pediatric
2. Tachycardia - Adult

### **Indications:**

1. Recurrent ventricular fibrillation or recurrent pulseless ventricular tachycardia
2. Recurrent hemodynamically unstable ventricular tachycardia
3. Stable ventricular tachycardia in consultation with online medical control

### **Contraindications:**

1. Hypersensitivity to Amiodarone

### **Dosing:**

1. Adult
  - a. Cardiac Arrest – persistent shockable rhythm
    - i. 300 mg IV/IO
    - ii. May repeat one time at 150 mg IV/IO
  - b. Tachycardia
    - i. Wide complex symptomatic but stable
    - ii. 150 mg IV over 10 minutes
2. Pediatric – Persistent shockable rhythm in cardiac arrest
  - a. 5 mg/kg IV/IO
  - b. Max dose 300 mg
  - c. May be repeated up to 2 more times (max total dose 15 mg/kg or 450 mg total)



### **Expected Effects:**

1. Prolongs refractory period
2. Inhibits alpha and beta adrenergic stimulation

### **Side Effects:**

1. Prolonged QT
2. Vasodilation
3. Hypotension



**Michigan**  
**MEDICATION SECTION**  
**ACETYLSALICYLIC ACID (ASPIRIN)**

Initial Date: 10/25/2017

Revised Date:

Section 9-15

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## ***Aspirin***

### **Protocols:**

1. Chest Pain/Acute Coronary Syndrome

### **Indications:**

1. Suspected cardiac chest pain
2. Suspected Myocardial Infarction

### **Contraindications:**

1. Hypersensitivity to aspirin or nonsteroidal anti-inflammatories

### **Dosing:**

1. Adult Only Medication
  - a. 324-325 mg chewable tablet PO

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## **Atropine**

### **Protocols:**

1. Bradycardia (Adult and Pediatric)
2. Poisoning
3. Nerve Agents/Organophosphate exposure



### **Indications:**

1. Symptomatic bradycardia with a suspected vagal origin
2. Exposure to organophosphates or other nerve agents

### **Contraindications:**

1. Known hypersensitivity (no absolute contraindications)

### **Dosing:**

1. Symptomatic Bradycardia
  - a. Adult:
    - i. Administer 0.5 mg IV/IO every 3-5 minutes
    - ii. Max dose 3 mg
  -  b. Pediatric:
    - i. Given ONLY if primary AV block, or if bradycardia is unresponsive to oxygenation, ventilation and epinephrine.
    - ii. Administer 0.01-0.02 0.02 mg/kg IV/IO
    - iii. Minimum single dose 0.1 mg
    - iv. Maximum single dose 1 mg
    - v. Repeat prn in 5 minutes, maximum total dose 3 mg
2. Organophosphate/Nerve Agent Exposures
  - a. Adults
    - i. 2-6 mg IV/IM per Mark 1 Kit Dosing Directive (each kit contains 2 mg of atropine)
    - ii. If kit is not available administer 2-6 mg IV/IM as needed
  -  b. Pediatrics
    - i. Infant 0.05-0.1 mg/kg IM/IV/IO (0.2-1 mg), Pediatric Atropen or Vial
    - ii. Child 1-4 mg IM/IV/IO, Pediatric Atropen, Vial, or Mark 1

### **Expected Effects:**

1. Increased heart rate
2. Dilated pupils

## **Calcium Chloride**

### **Protocols:**

1. Poisoning/Overdose
2. Crush Injury
3. Cardiac Arrest General – Adult

### **Indications:**

1. Cardiac arrest in the renal failure patient
2. Calcium channel blocker toxicity
3. Crush Injury with suspected hyperkalemia

### **Precautions:**

1. May precipitate digitalis toxicity
2. Extremely important to flush IV line fully after administration

### **Dosing:**

1. Cardiac Arrest
  - a. Adult:
    - i. 1 gm slow IV
2. Calcium channel blocker toxicity
  - a. Adult: 0.5 – 1 gm IV
3. Crush Injury
  - a. Adult: 1 gm slow IV over 5 minutes, after extrication

### **Expected Effects:**

1. Increased force of myocardial contraction
2. Rise in arterial pressure

## **Dextrose**

### **Protocols:**

1. Adult and Pediatric Seizures
2. Adult and Pediatric Altered Mental Status

### **Indications:**

1. Hypoglycemia
2. Altered mental status in the absence of a glucometer

### **Contraindications:**

None

### **Concentration:**

1. Dextrose 10% 25 gm in 250 ml
2. Dextrose 12.5% (for patients up to 2 months of age)
  - a. Created by expelling 37.5 ml from Dextrose 50% 50 ml syringe and drawing up 37.5 ml of NS
  - b. Creates 6.25 gm/ 50 ml concentration of 12.5%
3. Dextrose 25% (for patients between 2 months and 6 years of age)
  - a. Created by expelling 25 ml from Dextrose 50% 50 ml syringe and drawing up 25 ml of NS
  - b. Creates 12.5 gm/50 ml concentration of 25%
4. Dextrose 50% (prefilled syringe of 25 gm in 50 ml)

### **Dosing (ensure patent IV):**



1. Pediatric (weight based)
  - a. 3-5 kg, Dextrose 12.5%, dose: 2.5g, Volume: 20mL or Dextrose 10%, 25 ml
  - b. 6-7 kg, Dextrose 25%, dose: 3.25g, volume 13 mL or Dextrose 10%, 33 ml
  - c. 8-9 kg, Dextrose 25%, dose: 4.25g, volume 17 mL or Dextrose 10%, 43 ml
  - d. 10-11 kg, Dextrose 25%, dose: 5g, volume 20 mL or Dextrose 10%, 50 ml
  - e. 12-14 kg, Dextrose 25%, dose 6.25g, volume 25 mL or Dextrose 10%, 63 ml
  - f. 15-18 kg, Dextrose 25%, dose 8 g, volume 32 mL or Dextrose 10%, 80ml
  - g. 19-23 kg, Dextrose 25%, dose 10g, volume 40 mL or Dextrose 10%, 100 ml
  - h. 24-29 kg, Dextrose 50%, dose 12.5g, volume 25 mL or Dextrose 10%, 125 ml
  - i. 30-36 kg, Dextrose 50%, dose 15g, volume 30 mL or Dextrose 10%, 150 ml
2. Adult
  - a. Dextrose 50%, 25 gm, 50 ml
  - b. Dextrose 10%, 25 gm, 250 ml

### **Incompatibilities/Drug Interactions:**

1. Sodium bicarbonate
2. Diazepam will precipitate if given concurrently without flushing



## ***Diazepam***

### **Protocols:**

1. As indicated in **Medication Substitution Protocol**

### **Indications:**

1. Seizures when first line medications are not available

### **Precautions:**

1. Respiratory depression
2. Hypotension

### **Dosing:**



1. Adult: 5-10 mg IM/IV
2. Pediatric: 0.2 - 0.5 mg/kg IM/IV

### **Expected Effects:**

1. Skeletal muscle relaxation
2. Ceasing of seizure activity

## ***Diphenhydramine (Benadryl ®)***

### **Protocols:**

1. Anaphylaxis/Allergic reaction
2. Poisoning/overdose

### **Indications:**

1. Anaphylaxis
2. Mild or moderate allergic reaction
3. Urticaria

### **Contraindications:**

1. Lower respiratory distress
2. Hypersensitivity to diphenhydramine

### **Dosing:**

1. Adult: 50 mg IM or IV
2. Pediatric: 1-1.5 mg/kg IM or IV

### **Expected Effects:**

1. Antihistamine, decreased urticarial, itching
2. Drowsiness

## ***Dopamine***

### **Protocols:**

1. As indicated in the **Medication Substitution** protocol

### **Indications:**

1. Cardiogenic shock
2. Bradycardia with hypotension

### **Contraindications:**

1. Hemorrhagic shock

### **Dosing:**

1. Adults and Pediatric
  - a. Mix 400 mg/250 ml (1600 mcg/ml)
  - b. Administer 5 – 20 mcg/kg/min, titrated to effect of BP 90 systolic

### **Expected Effects:**

1. Increased BP
2. Increased HR

## ***Epinephrine***

### **Protocols:**

1. Anaphylaxis/Allergic Reaction
2. Shock
3. Respiratory Distress (Adult)
4. Pediatric Respiratory Distress, Failure, or Arrest
5. Adult Cardiac Arrest – General
6. Adult Bradycardia
7. Pulmonary Edema/CHF
8. Return of Spontaneous Circulation
9. Pediatric Cardiac Arrest - General
10. Pediatric Bradycardia
11. Neonatal Assessment and Resuscitation






### **Indications:**

1. Anaphylaxis
2. Bradycardia
3. Respiratory distress
4. Hypotension
5. Cardiac arrest

### **Contraindications:**

1. No contraindications in critical patients

### **Dosing:**



-  1. Epinephrine auto-injector (Protocols 1, 3, 4, MFR per MCA selection in protocol 1)
  - a. Adults 0.3 mg, IM
  -  b. Pediatrics
    - i. 0.15 mg, IM
    - ii. Pediatric auto-injector indicated for patients greater than 10 kg and less than 30 kg
-  2. Epinephrine 1mg/1mL (Protocols 1, 3, 4)
  - a. Adults 0.3 mg IM
  -  b. Pediatrics
    - i. For patients less than 10 kg contact medical control prior to administration
    - ii. For patients greater than 10 kg, administer 0.01 mg/kg, up to 0.3 mg
-  3. Nebulized (Protocol 4)
  - a. Racementephrine 2.25%
    - i. Place 0.5 mL in nebulizer
    - ii. Dilute with 3 mL normal saline
  - b. Epinephrine (1mg/1mL), 5 mL (5 mg) nebulized

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4. Epinephrine 1mg/10mL
  - a. IV Bolus (Protocols 5, 9, 10, 11)
    - i. Adults 1 mg every 3 to 5 minutes in cardiac arrest
    -  ii. Pediatrics 0.01 mg/kg (0.1mL/kg)
  - b. Push dose (Protocols 2, 6, 8)
    - i. Prepare by combining 1 mL of Epinephrine 1 mg/10 mL with 9 mL NS
    - ii. Adults
      1. Administer 10-20 mcg (1-2 mL Epinephrine 10 mcg/mL)
      2. Repeat every 3 to 5 minutes
      3. Titrate to SBP greater than 90 mm/Hg
    -  iii. Pediatrics
      1. Administer 1 mcg/kg (0.1 mL/kg Epinephrine 10 mcg/mL)
      2. Maximum dose 10 mcg (1 mL)
      3. Repeat every 3-5 minutes

**Expected Effects:**

1. Decreased wheezing
2. Increased BP
3. Increased HR

## ***Fentanyl***

### **Protocols:**

1. Intranasal Medication Administration
2. Pain Management
3. Patient Sedation


### **Indications:**

1. Pain management
2. Patient sedation

### **Contraindications:**

1. Altered Mental Status
2. Hypotension
3. Respiratory Depression
4. Hypersensitivity to Fentanyl

### **Dosing:**

1. Adult
  - a. 1 mcg/kg
  - b. Single dose up to 100 mcg
  - c. May repeat, up to a max dose of 200 mcg
-  2. Pediatric
  - a. 1 mcg/kg
  - b. Single dose up to 40 mcg (otherwise dose as adult)
  - c. May repeat, total dose up to 80 mcg

### **Expected Effects:**

1. Decreased pain
2. Decreased agitation

### **Side Effects:**

1. Drowsiness
2. Hypotension
3. Respiratory Depression
4. Vomiting

### **Special Notes:**

1. Naloxone will reverse the effect of Fentanyl
2. Administration with Ondansetron for nausea is encouraged

## **Glucagon**

### **Protocols:**

1. Altered Mental Status (Adult and Pediatric)
2. Seizures (Adult and Pediatric)


### **Indications:**

1. Hypoglycemia with inability to obtain IV access

### **Contraindications:**

1. Adrenal gland tumor
2. Hypersensitivity to glucagon

### **Dosing:**

1. Adult: 1 mg IM/SQ
-  2. Pediatric: 0.05 mg/kg up to 1 mg IM/SQ

### **Expected Effects:**

1. Increased blood glucose

### **Side Effects:**

1. Nausea
2. Vomiting

## ***Hydromorphone***

### **Protocols:**

1. Pain Management (MCA Selection)

### **Indications:**

1. Severe pain with extended transport time

### **Contraindications:**

1. Hypersensitivity
2. Hypotension
3. Hypovolemia

### **Dosing:**

1. Adults only 0.5 mg IV/IM
2. IV dose must be administered slowly, over 2 minutes
3. May repeat one time

### **Expected Effects:**

1. Decreased pain

### **Side Effects:**

1. Respiratory depression
2. Hypotension
3. Altered mental status



## **Cyanokit ® (Hydroxocobalamin)**

### **Protocols:**

1. Cyanide Exposure Supplement Protocol

### **Indications:**

1. Known or suspected cyanide poisoning

### **Contraindications:**

1. Hypersensitivity to hydroxocobalamin or cyanocobalamin
2. Can not be administered in the same line as dopamine or fentanyl

### **Dosing:**

1. A two vial kit with 2.5g of hydroxocobalamin each in powder form which must be reconstituted with 100mL of normal saline each, rotated or tipped for 30 seconds each (not shaken) and then administered through its own IV line (not used with any other medications) over 7.5 minutes each.
2. A one vial kit with 5g of hydroxocobalamin powder which must be reconstituted with 200mL of normal saline, be rotated or tipped for 60 seconds (not shaken) and administered through its own IV line (not used with any other medication) over 15 minutes.
3. The starting dose of hydroxocobalamin for adults is 5g (i.e., two 2.5g vials OR one 5g vial) administered as an intravenous (IV) infusion over 15 minutes.



4. Pediatrics:

#### **TWO VIAL KIT (2.5G/100ML)**

AGE GROUP	AMOUNT	DOSAGE
INFANT / TODDLER (0-2YEARS)	¼ BOTTLE	0.625G
PRESCHOOL (3-5 YEARS)	½ BOTTLE	1.25G
GRADE SCHOOL (6-13 YEARS)	1 BOTTLE	2.5G
ADULT >14YEARS	2 BOTTLES (ENTIRE KIT)	5G

#### **ONE VIAL KIT (5G / 200ML)**

AGE GROUP	AMOUNT	DOSAGE
INFANT / TODDLER (0-2YEARS)	1/8 BOTTLE	0.625G
PRESCHOOL (3-5 YEARS)	¼ BOTTLE	1.25G
GRADE SCHOOL (6-13YEARS)	½ BOTTLE	2.5G
ADULT >14YEARS	1 BOTTLE (ENTIRE KIT)	5G

### **Expected Effects:**

1. Increased blood glucose

### **Side Effects:**

1. Nausea
2. Vomiting
3. Abdominal pain
4. Red colored urine, skin, mucus membranes
5. Rash

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## ***Ibuprofen***

### **Protocols:**

1. Pain Management (per MCA selection)


### **Indications:**

1. Mild pain

### **Contraindications:**

1. Hypersensitivity
2. Active bleeding
3. <6 months of age
4. Pregnancy

### **Dosing:**

1. Adults – 10mg/kg PO, maximum dose 800 mg
-  2. Pediatrics – 10 mg/kg PO, maximum dose 800 mg

### **Expected effects:**

1. Pain Relief

### **Side effects:**

1. Nausea/vomiting
2. Abdominal pain
3. Heartburn

## ***Ipratropium Bromide (Atrovent ®)***

### **Protocols:**

1. Nebulized Bronchodilators


### **Indications:**

1. Bronchial asthma
2. Bronchospasm in emphysema
3. Chronic bronchitis
4. Other wheezing in adults and pediatrics

### **Contraindications:**

1. Hypersensitivity to ipratropium bromide
2. Hypersensitivity to atropine or its derivatives

### **Dosing:**

1. Adult: 500 mcg/3 ml combined with Albuterol 2.5 mg/3ml, nebulized
2. Pediatric: For children aged 5 or under, Ipratropium 250 mcg should be given 

### **Expected Effects:**

1. Decreased wheezing
2. Decreased respiratory distress

### **Side Effects:**

1. Palpitations
2. Dry Mouth
3. Anxiety

---

## Ketamine

### Protocols:

1. Excited Delirium
2. Patient Sedation
3. Pain Management
4. Patient Restraint





### Indications:

1. Patients with excited delirium
2. Agitation
3. Significant pain

### Contraindications:

1. Known hypersensitivity

### Dosing:

1. Excited Delirium
  - a. Adults only – 4 mg/kg IM
2. Patient Sedation
  - a. Adults and Pediatrics 
    - i. 4 mg/kg IN, if available or
    - ii. 1-2 mg/kg IV/IO
    - iii. Maximum single dose 500 mg
    - iv. May repeat after 10-15 minutes with medical direction 
3. Pain Management
  - a. Adults and Pediatrics 
    - i. 0.5 mg/kg IN, if available or
    - ii. 0.2 mg/kg IV/IO
    - iii. Maximum single dose 25 mg
    - iv. May repeat after 10-15 minutes to a maximum dose of 2 mg/kg
-  4. Patient Restraint

### Expected Effects:

1. Sedation
2. Decreased agitation
3. Decreased pain

### Side Effects:

1. Nausea/vomiting
2. Nystagmus

---

## ***Ketorolac (Toradol ®)***

### **Protocols:**

1. Pain Management (per MCA selection)


### **Indications:**

1. Mild to moderate pain

### **Contraindications:**

1. Allergies to NSAIDs
2. Active labor or women who are breastfeeding
3. Renal impairment
4. Bleeding or high risk of bleeding
5. Pregnancy

### **Dosing:**

1. Adults – 15 mg IM/IV
-  2. Pediatrics – 1 mg/kg IM/IV (max dose 15 mg)

### **Expected effects:**

1. Pain Relief

### **Side effects:**

1. Nausea/vomiting
2. Bloating

## **Lorazepam (Ativan ®)**

### **Protocols:**

1. Adult and Pediatric Seizures
2. Medication Substitution

### **Indications:**

1. Seizures (per MCA selection)
2. Seizures when Midazolam is unavailable

### **Contraindications:**

1. Hypersensitivity to lorazepam
2. Hypotension
3. Respiratory failure

### **Dosing:**

1. Adults: 4 mg IV/IO



2. Pediatrics:

- a. 0.1 mg/kg

- b. Max single dose 4 mg, may repeat to maximum of 8 mg

### **Expected Effects:**

1. Seizure cessation
2. Sedation

### **Side Effects:**

1. Respiratory depression
2. Hypotension
3. Nausea/Vomiting

---

## **Lidocaine**

### **Protocols:**

1. Adult Cardiac Arrest – General (MCA Selection)
2. Adult and Pediatric Tachycardia (MCA Selection)
3. Vascular Access & IV Fluid Therapy (IO placement)





### **Indications:**

1. Alternative to amiodarone in cardiac arrest from VF/VT
2. Alternative to amiodarone in pulsatile VT
3. As an anesthetic agent when administering medications via intraosseous route

### **Contraindications:**

1. Hypersensitivity to lidocaine
2. Bradycardia or heart block

### **Dosing:**

1. Cardiac Arrest (Adult) 100 mg IV/IO
2. Wide complex tachycardia
  - a. Adults: 1 mg/kg
  -  b. Pediatric: 1 mg/kg (only with medical direction) 
  - c. May repeat after 5-10 minutes to a maximum of 3 mg/kg
3. For conscious patients with pain from IO infusion
  - a. Adults: 20 mg IO
  -  b. Pediatrics: 0.5 mg/kg, maximum dose 20 mg 

### **Expected Effects:**

1. Increased VF threshold
2. Decreased ventricular irritability
3. Decreased pain with infusion

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## ***Magnesium Sulfate***

### **Protocols:**

1. Adult Cardiac Arrest - General
2. Adult Tachycardia
3. Adult Respiratory Distress
4. Adult Seizures

### **Indications:**

1. Suspected Torsades de Pointes
2. VF/VT in hypomagnesemia
3. Seizures secondary to toxemia of pregnancy
4. Asthma exacerbation not responding to first line treatments

### **Contraindications:**

1. Hypersensitivity to magnesium sulfate
2. Should not be given for 2 hours preceding delivery

### **Dosing:**

1. Cardiac Arrest (and Wide Complex Tachycardia)
  - a. 2 grams diluted in 10 ml NS
  - b. Administered IVP
2. Asthma exacerbation (refractory)
  - a. 2 grams diluted in 10 ml normal saline
  - b. Administered over 10 to 20 minutes
  - c. Administer with open line of normal saline
3. Seizures in pregnancy
  - a. 2 grams diluted in 20 ml
  - b. Administered over 10-20 minutes
  - c. Administer with open line of normal saline

### **Expected Effects:**

1. Seizure cessation
2. Decreased respiratory distress

### **Side Effects:**

1. Respiratory depression
2. Hypotension
3. Asystole
4. Burning in IV site for conscious patients



## **Methylprednisolone**

### **Protocols:**

1. Anaphylaxis/Allergic Reaction
2. Adrenal Crisis
3. Adult Respiratory Distress
4. Pediatric Respiratory Distress, Failure, or Arrest


### **Indications:**

1. Allergic reactions
2. Airway inflammation
3. Reactive airway disease
4. Acute adrenal insufficiency

### **Contraindications:**

1. Hypersensitivity to methylprednisolone (or similar)
2. Inability to swallow (by age or patient status)

### **Dosing:**

1. Adult 125 mg IV/IO
-  2. Pediatrics 2 mg/kg IV/IO (max dose 125mg)

### **Expected Effects:**

1. Decreased inflammation

### **Side Effects:**

1. Dizziness
2. Nausea/vomiting

## **Midazolam (Versed ®)**

### **Protocols:**

1. Adult and Pediatric Seizures
2. Excited Delirium
3. Heat Emergencies
4. Patient Restraint
5. Patient Sedation
6. Nerve agent/Organophosphate Pesticide Exposure



### **Indications:**

1. Adult or pediatric seizures
2. Sedation for patients receiving electrical therapy
3. Excited delirium or severe agitation to enable assessment and/or treatment

### **Contraindications:**

1. Hypersensitivity to midazolam
2. Shock

### **Dosing:**

1. Seizures
  - a. Adults
    - i. 10 mg IM
    - ii. 5 mg IN
    - iii. 5 mg IV/IO
    - iv. May repeat with medical direction
  -  b. Pediatrics
    - i. 0.1 mg/kg IM (maximum dose 10 mg)
    - ii. 0.05 mg/kg IV/IO (maximum dose 5 mg)
    - iii. May repeat with medical direction
2. Excited Delirium and Chemical Restraint (Adults ONLY)
  - a. 10 mg IM **or**
  - b. 5 mg IN
3. Patient Sedation (and for tremors in heat emergencies)
  - a. Adults
    - i. 1-5 mg IV/IO/IN (0.05 mg/kg)
    - ii. Titrated slowly
    - iii. May repeat once in 5 minutes to a maximum of 0.1 mg/kg
  -  b. Pediatrics
    - i. 0.05 mg/kg IV/IO (max single dose 5 mg)
    - ii. Titrated slowly
    - iii. May repeat once in 5 minutes to a maximum of 0.1 mg/kg

### **Expected Effects:**

1. Seizure cessation
2. Sedation

### **Side Effects:**

1. Respiratory depression



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**MEDICATION SECTION**  
**MIDAZOLAM (VERSED ®)**

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2. Hypotension

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## ***Morphine***

### **Protocols:**

1. Pain Management (MCA Selection)
2. Medication Substitution



### **Indications:**

1. Severe pain

### **Contraindications:**

1. Hypersensitivity to morphine
2. Hypotension

### **Dosing:**

1. 0.1 mg/kg
  - a. Adults max single dose 10 mg
  -  b. Pediatrics administer no more than 1 mg in a single dose
2. May repeat
  - a. Adults up to 20 mg
  -  b. Pediatrics up to total dose of 5 mg

### **Expected Effects:**

1. Decreased pain

### **Side Effects:**

1. Respiratory depression
2. Hypotension

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## **Naloxone (Narcan ®)**

### **Protocols:**

1. Adult and Pediatric Altered Mental Status
2. Pediatric Respiratory Distress, Failure, or Arrest
3. Poisoning/Overdose
4. Naloxone Administration


### **Indications:**

1. Known opioid overdose with respiratory depression
2. Respiratory depression or arrest of unknown or suspicious origin

### **Contraindications:**

1. Hypersensitivity to naloxone

### **Dosing:**

1. For MFR and EMT-Basic (Per MCA selection)
  - a. 0.4 mg IN
  - b. 2.0 mg pre-filled syringe IN
  - c. 4.0 mg intranasal spray
2. For Specialist and Paramedic
  - a. 0.4 mg IN/IM/IV/IO
  - b. Repeat as needed
  - c. May need larger doses dependent on substance
-  3. Pediatrics (Specialist and Paramedics Only)
  - a. 0.1 mg/kg IV/IO/IM
  - b. Max dose 2 mg

### **Expected Effects:**

1. Increased mental status
2. Increased respiratory drive

### **Side Effects:**

1. Agitation
2. Nausea/vomiting

## **Nitroglycerin**

### **Protocols:**

1. Chest Pain/Acute Coronary Syndrome
2. Nitroglycerin Drip Supplement (Optional)
3. Pulmonary Edema/CHF

### **Indications:**

1. Chest, arm, or neck pain thought to be caused by cardiac ischemia
2. Pulmonary edema
3. Nitroglycerin drip may be used as a supplement to both above indications when sublingual nitroglycerin has not relieved symptoms and the MCA has both adopted the supplement and trained the providers. The provider must use vented IV tubing and an infusion pump.

### **Contraindications:**

1. Use of erectile dysfunction medications within the previous 48 hours

### **Dosing:**

1. MFR and EMT Basic may assist patients with their own sublingual nitroglycerin
2. Sublingual nitroglycerin
  - a. 0.4 mg sublingual if BP is above 100 mmHg
  - b. May repeat at 3 to 5 minute intervals if pain persists and BP sustains
  - c. May be administered prior to IV start if BP is above 120 mmHg
3. Nitroglycerin IV drip (MCA selection)
  - a. Begin drip at 10 mcg/min
  - b. Increase by 10 mcg/min at 5 minute intervals, titrating to pain and BP
  - c. Maximum dose is 200 mcg/min

### **Expected Effects:**

1. Decreased blood pressure
2. Relief of chest pain

### **Side Effects:**

1. Headache
2. Flushing
3. Hypotension

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## Ondansetron (Zofran ®)

### Protocols:

1. Nausea/Vomiting
2. Pain Management


### Indications:

1. Nausea and vomiting
2. Prophylactic use in patients receiving opioids for pain management to prevent nausea/vomiting

### Contraindications:

1. Hypersensitivity to ondansetron (or similar)
2. Patients with Phenylketonuria (PKU)

### Dosing:

1. Adult
  - a. 4 mg ODT (oral dissolving tablet)
  - b. 4 mg IM
  - c. 4 mg slow IV (at least 30 seconds, recommended over 2 minutes)
-  2. Pediatrics
  - a. For patients less than 40 kg, 0.1 mg/kg slow IV
  - b. For patients greater than 40 kg, 4 mg slow IV
  - c. Not routinely give IM in pediatrics, administer over at least 30 seconds, recommended over 2 minutes

### Expected Effects:

1. Diminished nausea

### Side Effects:

1. Headache
2. Dry mouth
3. Drowsiness

## **Prednisone**

### **Protocols:**

1. Anaphylaxis/Allergic Reaction
2. Adrenal Crisis
3. Adult Respiratory Distress
4. Pediatric Respiratory Distress, Failure, or Arrest


### **Indications:**

1. Allergic Reaction
2. Inflammatory respiratory issues

### **Contraindications:**

1. Hypersensitivity to steroids
2. Known systemic fungal infections

### **Dosing:**

1. Adult (and children over 6 years old  ): 50 mg tablet, PO

### **Expected Effects:**

1. Decreased inflammation

### **Side Effects:**

1. Retention of fluids



## ***Sodium Bicarbonate (NaHCO<sub>3</sub>)***

### **Protocols:**

1. Excited Delirium
2. Adult and Pediatric Cardiac Arrest – General
3. Poisoning/Overdose
4. Crush Injury


### **Indications:**

1. Cardiac arrest with suspected hyperkalemia
2. Tricyclic antidepressant (TCA)
3. To cause alkalization in significant acidosis

### **Contraindications:**

1. Hypersensitivity to sodium bicarbonate
2. Severe pulmonary edema
3. Known Alkalosis

### **Dosing:**

1. Adults in Excited Delirium: 50 mEq IV
-  2. Adult and Pediatric Cardiac Arrest: 1 mEq/kg IV/IO
3. TCA overdose with widened QRS
  - a. 1-2 mEq/kg IV/IO
  - b. May be repeated to narrow QRS and improve blood pressure
4. Crush Injury: 1 mEq/kg IV/IO, max dose 50 mEq

### **Precautions:**

1. Must flush IV line between medications
2. Administer slowly
3. Only given if acidosis is suspected

## ***Tetracaine Hydrochloride***

### **Protocols:**

1. Poisoning/Overdose
2. Chemical Exposure

### **Indications:**

1. Used before/after eye irrigation for pain
2. Chemical exposure to eyes

### **Contraindications:**

1. Hypersensitivity to anesthetics
2. Large area application
3. Infants less than 1 year

### **Dosing:**

1. Adults and Pediatrics great than 1 year old
  - a. 1 to 2 drops per eye
2. May be used before/after flushing eye

### **Expected Effects:**

1. Numbing of eye

### **Side Effects:**

1. Burning
2. Irritation
3. Rash

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***Tranexamic Acid (TXA) (Optional)***

**Protocols:**

1. Shock


**Indications (TRAUMATIC CAUSE ONLY):**

1. Evidence of marked blood loss
2. Sustained tachycardia (>110/Min, despite a 500 ml bolus of IVFs)
3. Initial systolic BP < 90
4. Sustained hypotension (<100 systolic, despite a 500 ml bolus of IVFs)
5. Major trauma with suspicion for pelvic and/or abdominal injury
6. Major arterial bleeding not controlled with tourniquet

**Contraindications:**

1. Hemorrhagic shock from a non-traumatic cause (massive Gastrointestinal or Gynecological bleeding)

**Dosing:**

1. Adults
  - a. 1 g of TXA mixed in 100 ml of normal saline
  - b. Administered over 10 minutes
-  2. Pediatrics (only appropriate inside a formal research study)
  - a. 15 mg/kg TXA
  - b. Administered over 10 minutes

**Precautions:**

1. Must be administered within 3 hours of injury
2. Do not delay transport for administration of TXA
3. TXA delivered in the field is a loading dose
  - a. It is not effective if a second dose is not given at the appropriate time in the hospital
  - b. It is very important that the administering provider make note of the time that the loading dose is given